Datascope
Viewstation OR™

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Foreword

The Viewstation OR Operating Instructions are intended to provide the information required to operate the Viewstation OR. For additional information and technical assistance, please contact a Mindray DS Patient Monitoring Representative.

A general understanding of the features and functions of the Viewstation OR and its components (shown in FIGURE 1-1) is a prerequisite for the proper use of this equipment. Therefore, do not operate this equipment before reading these instructions thoroughly, including all appropriate warnings and cautions.

CAUTION: **US Federal law restricts the sale of this device to, by or on the order of a physician.**

NOTE: **Figures in this manual are provided for reference purposes only. Screens will likely differ based on the monitoring device configuration and selected parameter configurations of the Viewstation OR.**

Warnings, Precautions and Notes

Please read and adhere to all of the warnings and precautions listed throughout this manual.

A **WARNING** is provided to alert the user to potentially serious outcomes (death, injury or serious adverse events) to the patient or the user.

A **CAUTION** is provided to alert the user that special care should be taken for the safe and effective use of the device. They will include actions to be taken to avoid effects on patients or users that will not be potentially life threatening or result in serious injury, but about which the user should be aware.

A **NOTE** is provided when additional general information is available.

Warnings

WARNING: Only qualified and trained personnel or Mindray DS Service personnel should attempt to service Mindray DS equipment. Service is defined as any activity requiring the cover to be removed for internal adjustments, parts replacements, repairs or software upgrades of any kind to insure compatibility.

WARNING: To insure compatibility with the operating system and applications software, use only Mindray DS USA Inc. supplied and/or approved components to repair any part of the Viewstation OR. Use of unauthorized software, devices, accessories, or cables other than those approved by Mindray DS may render the application unsuitable for medical patient monitoring. It may also result in increased electromagnetic emissions or decreased Immunity of the system.

WARNING: Route cables neatly. Ensure cables are not in the way of patient or hospital personnel.

WARNING: All of the equipment on the Viewstation OR network must utilize the hospital emergency power system. Failure to do so will result in loss of monitoring during extended periods of power failure.

WARNING: Do not put MPSO (Multiple Portable Socket Outlets, i.e., multiple outlet extension cords) used with the Viewstation OR equipment on the floor. Connect only approved accessories and components to the same MPSO as the Viewstation OR equipment. Do not overload MPSOs. Use only MPSOs that comply with the requirements of IEC 60601-1-1.

WARNING: PACEMAKER PATIENTS - Indication of the heart-rate may be adversely affected by cardiac pacemaker pulses or by cardiac arrhythmias. Keep pacemaker patients under close surveillance. Refer to "ECG" on page 7-2 for disclosure of the pacer rejection capability.

WARNING: PACEMAKER PATIENTS - Rate meters may continue to count the pacemaker rate during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter alarms. Keep pacemaker patients under close surveillance.

WARNING: When connecting any Spectrum OR monitor, verify its location and associated device ID and bed number.

Cautions

CAUTION: **For proper operation do not obstruct the fan air holes.**

CAUTION: **For proper operation use only hospital grade power cords.**

CAUTION: **For proper operation, do not use the Viewstation OR equipment with a frayed or damaged power cord.**

CAUTION: **For proper operation never place fluids on top of this equipment. In case of accidental spillage, wipe clean immediately and have the system serviced to ensure no hazard exists.**

CAUTION: **For proper monitoring of patient information, do not block the operators' clear view of the Viewstation OR data display(s).**

CAUTION: **Changes or modifications not expressly approved by Mindray DS USA Inc. could void the user's warranty.**

CAUTION: **To avoid potential system issues, deactivate the touch screen before cleaning.**

CAUTION: **DO NOT spray glass cleaner directly on a display as it could possibly leak inside a non-sealed unit and cause damage.**

CAUTION: **Some pacemakers may contain a respiratory sensor that may produce artifact on an ECG waveform.**

CAUTION: **The Viewstation OR must be installed outside the patient's vicinity.**

CAUTION: **The Viewstation OR CPU should not be used within 25 cm of the point where leakage or discharge of a flammable anesthetic mixture with oxygen or nitrous oxide may occur.**

CAUTION: **Do not use the Viewstation OR if the case has been dropped or damaged.**

Indications for Use

The indications for use for the Viewstation OR include viewing real time patient clinical data. The clinical data displayed by the Viewstation OR is obtained from a Spectrum OR™ patient monitor and includes: ECG waveforms, Invasive and Non-Invasive Blood Pressures, Blood Oxygenation (SpO$_2$), Heart Rate, Respiration Rate, PVC/min, Temperature, CO$_2$ inspired and end tidal, CO/CI, CCO/CCI, SvO$_2$ and PAWP for a patient.

The Viewstation OR is intended for use in a fixed, non-portable, permanent location as a secondary independent remote display in the Operating Room department. The Viewstation OR does not display or annunciate physiological or technical alarms originating from the Spectrum OR monitor. The Viewstation OR is not intended to be directly connected to the patient at any time or installed within a six foot radius of the patient.

Unpacking Information
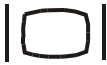
The Viewstation OR must be installed by a certified Mindray DS Service Technician or authorized distributor. Please contact your authorized Mindray DS Service Representative for additional information.

Technical Support

For technical assistance please contact your area or regional Mindray DS Patient Monitoring Representative.

Additional information relating to the servicing and repair of the Viewstation OR is provided in the Viewstation OR Service Manual (P/N 0070-00-0665).

Symbols and Descriptions

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
⚠	Attention, Consult Accompanying Documents / Refer to Manual		Monitor
∿	Alternating Current (AC)		Touch Screen
⎓	Direct Current (DC)		Earth Ground
	Keyboard	Patient Network	Panorama Patient Network Ethernet
	Mouse	CSA	Mark of compliance with U.S. and Canadian safety standards requirement.
	Input/Output		Do not dispose of this product as unsorted municipal waste.

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1.0 *System Overview*

This section provides a high level view of the authorized components for the Viewstation OR.

- • The Viewstation OR
- • Basic Configuration
- • Supported Device

1.1 The Viewstation OR

Viewstation OR enables real-time clinical data to be presented on an independent, remote, secondary display for surgeons and perfusionists.

The Viewstation OR CPU receives data from a Spectrum OR™ and transmits it to the independent display which can be configured to meet the needs of various clinicians. (See section 1.2, Basic Configuration.)

While accessing the tabs that are associated with the menu bar buttons, the Viewstation OR display automatically re-configures as a split-screen. The top half of the screen displays patient data while the bottom half of the screen is converted to a work space for simultaneously entering and modifying display configurations.

1.2 Basic Configuration

As depicted in FIGURE 1-1, the basic configuration of the Viewstation OR is:

• Spectrum OR Bedside Monitor

• Viewstation OR computer (CPU)

• Independent Display

• Touch Pad
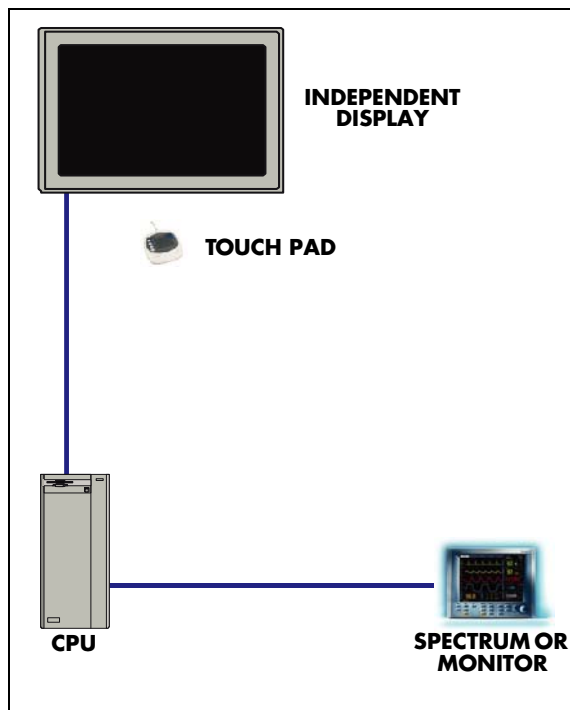
FIGURE 1-1 Basic Components of the Viewstation OR

This configuration can be varied to include two identically configured displays per Viewstation OR computer and may also access the Spectrum OR monitor through an Ethernet network switch (see FIGURE 1-2).
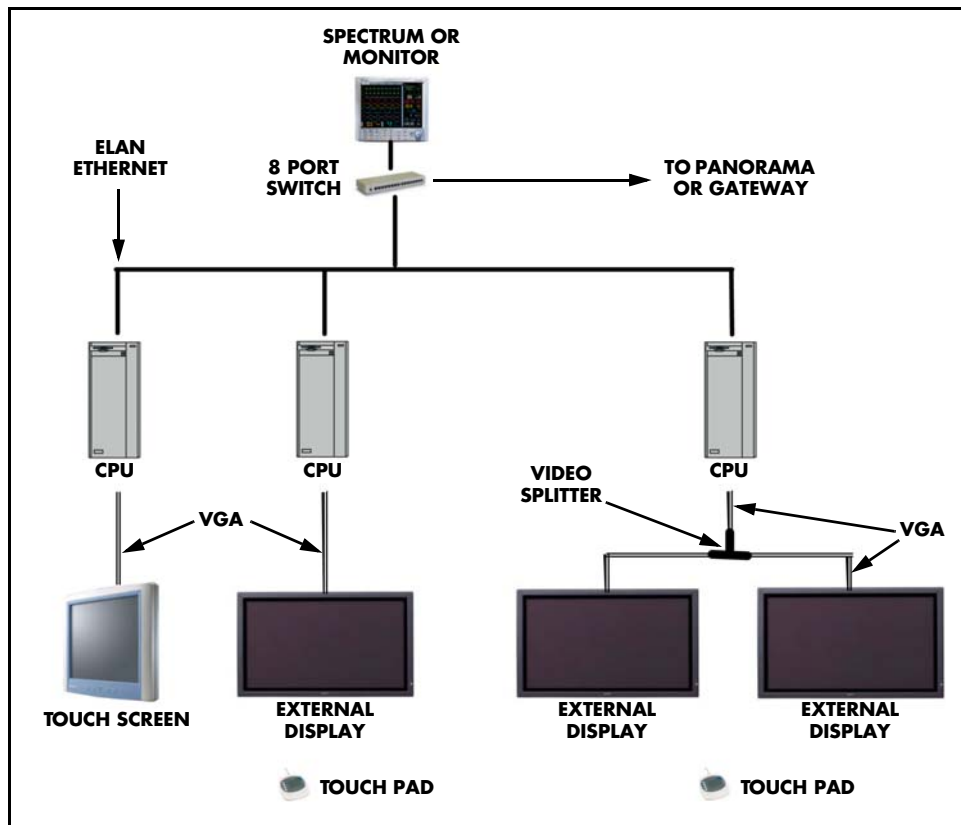
FIGURE 1-2 Example Multiple Display Configuration of the Viewstation OR

1.3   Supported Device

1.3.1   Spectrum OR™

All Viewstation OR data is sourced from the Spectrum OR, a vital signs bedside monitor designed specifically for the operating room environment. The following table lists the Spectrum OR parameters that are supported by the Viewstation OR.

SUPPORTED PARAMETERS
HR
PVC/min
Resp
NIBP (S/D/M)
SpO_2
IBP1 (S/D/M)
IBP2 (S/D/M)
IBP3 (S/D/M)
IBP4 (S/D/M)
I/E CO_2
T1
T2
T Blood
CO
CI
CCO
CCI
SvO_2
PAWP

NOTE: **The Viewstation OR does not display or annunciate physiological or technical alarms. All physiological alarms originate in the Spectrum OR.**

2.0 *Viewstation OR Main Screen*

This section provides an overview of the Viewstation OR main screen.

2.1 The Main Screen

The Main Screen for the Viewstation OR is used to display patient data and to navigate the system.

The Main Screen includes the following elements:

- Waveform Parameter Tiles
- Digital Parameter Tiles
- Menu Bar
- System Status/Demographics Area
- Date and Time
- Display States

2.1.1 Waveform Parameter Tiles

Waveform parameter tiles are the core elements of the Viewstation OR system (see FIGURE 2-1). These tiles display patient data obtained from the Spectrum OR™. Three to eight waveform parameter tiles may be displayed at once.

Each waveform parameter tile is divided into two sections:

- Waveform Area
- Waveform Digital Area

FIGURE 2-1 Example Waveform Parameter Tile

Configuring Waveform Parameter Tiles

1. Select the desired waveform parameter tile. The waveform configuration dialog box opens (see the examples in FIGURE 2-2 and FIGURE 2-3). The configuration options include **Sensor Color**, **Wave Gain** (all waveforms except SpO_2), **Change To** and **Pacer Enhancement** (ECG1 waveform only). The Pacer Enhancement factory default setting is OFF.
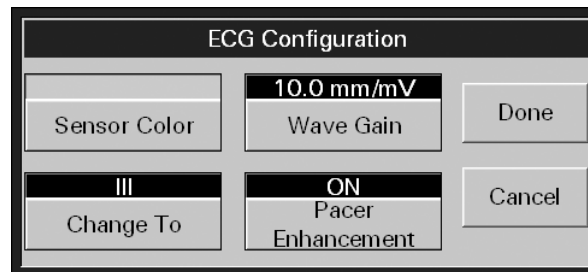
FIGURE 2-2 Example ECG Waveform Configuration Dialog
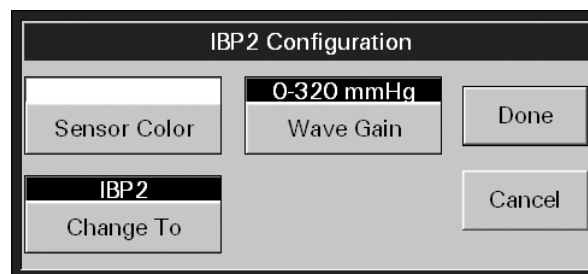
FIGURE 2-3 Example IBP Waveform Configuration Dialog

NOTE: **The Change To choice control is based on the sensors utilized by the Spectrum OR. When viewing the top waveform area, the Change To choices are limited to ECG waveforms only.**

NOTE: **The Change To choice control is hidden in ECG waveforms when a 3-wire ECG lead set is utilized by the Spectrum OR.**

2. Select the **Done** or **Cancel** button.

- The **Done** button accepts the changes.
- The **Cancel** button rejects the changes.

NOTE: **Changes made in the Waveform Configuration Dialog box apply to both the Waveform Area and the Waveform Digital Area.**

NOTE: **Changes made in the Waveform Configuration Dialog box will be reflected in the Display Tab, and vice versa.**

2.1.1.1   Waveform Area

The waveform area displays waveform data parameters. The following is a list of the available waveform areas.

FIGURE 2-4 Example ECG Waveform Area

- The **ECG1** waveform is always located in the top waveform area. Based on the ECG lead set that is in use, other ECG waveforms can be displayed in other waveform areas. A scale bar is viewable and wave gain settings are displayed. Filters set at the Spectrum OR™ can be viewed in this area, including Monitor bandwidth ("MON"), Extended bandwidth ("EXT") and ST bandwidth ("ST").

- The **SpO$_2$** waveform area displays an SpO$_2$ waveform.

- The **IBP1** through **IBP4** waveforms include a scale bar and wave gain settings. When an IBP area has been labeled at the Spectrum OR, the label will also display in the Viewstation OR. Wave gain settings include 0 – 20, 0 – 40, 0 – 80, 60 – 140, 0 – 160, 0 – 225, 0 – 320, and (-10) – 10 mmHg.

- The **Respiration** waveform area includes a scale and wave gain settings. The wave gain choices include 1, 2, 3, 4, and 5.

- The **CO$_2$** waveform area displays the wave gain scale with the associated unit of measure (mmHg, %, or kPa) as set at the Spectrum OR.

Waveforms are shown in a configured color and wave gain. If individual configurations are not set, the system default settings are used. A waveform can be displayed in more than one tile.

2.1.1.2   Waveform Digital Area

Waveform digital areas display waveform numeric data. Below is a list of the available waveform digital areas.

FIGURE 2-5 Example Resp Waveform Digital Area

• The **Heart Rate** waveform digital area is always located adjacent to the ECG1 waveform. It displays the heart rate numeric value, ECG lead indicator, Beats Per Minute (BPM) and Pacer Enhancement icon (if enabled). (The Pacer Enhancement icon is only available in the Heart Rate tile.)

FIGURE 2-6 Pacer Icon

• The **ECG Lead** waveform digital areas are located adjacent to ECG waveforms that are not in the ECG1 position. They display the ECG lead indicator.

• The **SpO₂** waveform digital area displays SpO_2 numeric values and the % unit of measure.

• The **IBP1** through **IBP4** waveform digital areas display Systolic, Diastolic and Mean blood pressure numeric values. When an IBP area has been labeled at the Spectrum OR, it will also display in the Viewstation OR. Labels include ART, ICP, CVP, LA, LV, RA, PA and UA.

  The **IBP1** through **IBP4** waveform digital areas can also be viewed with Pulsatile and Non-Pulsatile layouts. A Pulsatile layout configures Systolic and Diastolic as the primary parameters and Mean as the secondary parameter. A Non-Pulsatile layout configures Mean as the primary parameter and Systolic and Diastolic as the secondary parameters.

• The **Resp** waveform digital area displays the Resp numeric value and the RPM unit of measure.

• The **CO₂** waveform digital area displays Inspired and End-Tidal numeric values for CO_2 Its unit of measure (mmHg, %, or kPa) is set at the Spectrum OR.

Digital data is shown in the color assigned to the parameter. If individual configurations are not set, the system default settings are used.

2.1.2   Digital Parameter Tiles

The digital parameter tiles display up to six parameters, based on the sensors available for the attached Spectrum OR™. Below is a list of available digital parameter tiles.

FIGURE 2-7 Example Digital Parameter Tiles

- The **PVC/min** digital parameter tile displays the PVC/min numeric value.

- The **Temperature** digital parameter tile (T1, T2, Tb) displays the temperature reading and its unit of measure (Fahrenheit or Celsius) as set at the Spectrum OR.

- The **CO/CI** digital parameter tile displays the Cardiac Output/Cardiac Input numeric values in LPM/LPM/m^2 units of measure.

- The **PAWP** digital parameter tile displays the PAWP numeric value in mmHg units of measure and the time the most recent measurement was taken.

- The **CCO/CCI** digital parameter tile displays the CCO/CCI numeric values in LPM/LPM/m^2 units of measure and the time the most recent measurement was taken.

- The **SvO$_2$** digital parameter tile displays the SvO$_2$ numeric value in % units of measure.

- The **NIBP** digital parameter tile displays the measures for Systolic, Diastolic, Mean, Elapsed Time and the time the most recent measurement was taken. It is fixed in the bottom right corner of the screen and only its display color can be modified.

NOTE: **The CO, PAWP and NIBP parameters have a "Timeout" setting in the Spectrum OR monitor. If this setting is exceeded for any of these parameters, the numeric data in the associated tile will be replaced with dashes and the "time stamp" will be removed.**

Configuring Digital Parameter Tiles

1. Select the desired digital parameter tile. The digital configuration dialog box opens (see the examples in FIGURE 2-8 and FIGURE 2-9). The configuration options include **Sensor Color** and **Change To**.
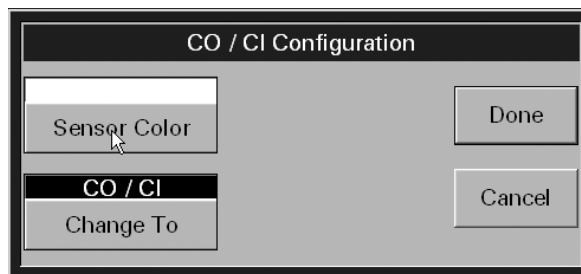
FIGURE 2-8 Example CO/CI Digital Configuration Dialog
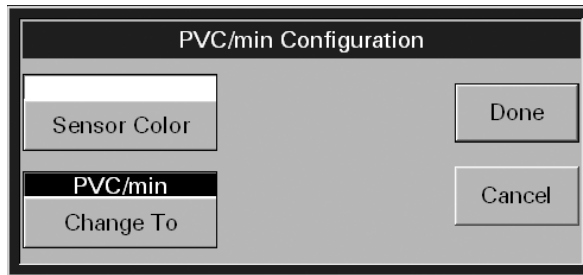
FIGURE 2-9 Example PVC/min Digital Configuration Dialog

NOTE: **The Change To choice control is based on the sensors utilized by the Spectrum OR™.**

2. Select the **Done** or **Cancel** button.

- The **Done** button accepts the changes.
- The **Cancel** button rejects the changes.

NOTE: **Changes made in the Digital Configuration Dialog box will be reflected in the Display Tab, and vice versa.**

2.1.3   Menu Bar

The menu bar provides navigation for the Viewstation OR and is fixed at the bottom of the screen. The table below provides a list of the functions and tabs associated with each menu button.

FIGURE 2-10 Menu Bar

BUTTON	PURPOSE
Lead	Cycles through each of the waveforms in the ECG ordered set for ECG1. Not available if using a 3-lead cable. Has no associated tabs.
Patient Setup	Provides access to the following tabs: • The **Display** tab is used to select the parameter information displayed on the main screen. • The **Wave Gain (patient)** tab is used to adjust the wave gain used for displayed waveforms.
System Setup	Provides access to the following tabs: • The **Parameter Color** tab is used to create the system default parameter color assignment. • The **Equipment Setup** tab is used to connect and disconnect the Spectrum OR™ that is displayed at the Viewstation OR. • The **Touch Screen** tab is used to turn the touch screen on and off and to recalibrate the touch screen display. • The **Wave Gain (system)** tab is used to adjust the system default wave gain setting for displaying waveforms.

2.1.4   System Status/Demographics Area

The Viewstation OR displays system status and demographics information at the bottom of the screen, between the menu bar and the date and time. System events indicate system-wide issues and are listed based on the system violation. System events are resolved when the system-wide condition no longer exists. The patient's bed number and the touch screen status are also displayed in this area.

NOTE: **If there are multiple messages to display, they will scroll in the System Status area.**

The table below provides the system event messages and bed ID information that may be shown in the System Status/Demographics area.

MESSAGE/ISSUE*	REASON
System Service required - Contact Mindray DS or Authorized Mindray DS Distributor (100)	This message will be displayed after the Viewstation OR is automatically restarted because a system issue was detected.
System Service required - Contact Mindray DS or Authorized Mindray DS Distributor (300)	The Viewstation OR has detected a hard drive error. Please notify Mindray DS Service personnel when this system event message is displayed. **NOTE:** **It is important to notify Mindray DS Service personnel when this system event message is displayed. This message indicates that while data was being written to or read from the system hard drive, an error was detected. Until service personnel correct this issue, patient data may be lost (for example, demographic information, alarm configurations, and historical patient data). Real time parameter monitoring and alarm checking will not be affected by this message. This message will be displayed until reset by service personnel.**
Touch Screen Off	The touch screen functionality is off.
Bed number	The bed number is updated when the bed number is changed on the Spectrum OR™.

     *   *Messages are shown in all bold text.*

2.1.5   Date and Time

The date and time, which are provided in the bottom right corner of the Viewstation OR display, are formatted during software installation.

FIGURE 2-11 Date and Time

2.1.6   Display States

The Viewstation OR displays full-screen messages when it has left active display mode. The messages and possible resolutions are described below.

MESSAGE	REASON	RESOLUTION
Standby	The Spectrum OR is in a standby state.	Remove the Spectrum OR from the standby state. Refer to the Spectrum OR Operating Instructions Manual.
Discharged	The Spectrum OR is in a discharged state.	Remove the Spectrum OR from the discharged state. Refer to the Spectrum OR Operating Instructions Manual.
Communications Lost	Communication between the Viewstation OR computer and the Spectrum OR has been lost.	Reestablish communication with the Spectrum OR.
Waiting for Patient	The Viewstation OR computer has been rebooted.	Wait for the Viewstation OR computer to reboot.
	The Spectrum OR is not yet connected to the Panorama Patient Monitoring Network.	Connect the Spectrum OR to the Panorama Patient Monitoring Network.

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3.0   *Patient Setup Functions*

This section describes patient setup at the Viewstation OR.

- Display Tab
- Wave Gain Tab (Patient)

3.1   Display Tab

The **Display** tab is used to select the waveform parameters that will appear in the main screen for the active session.
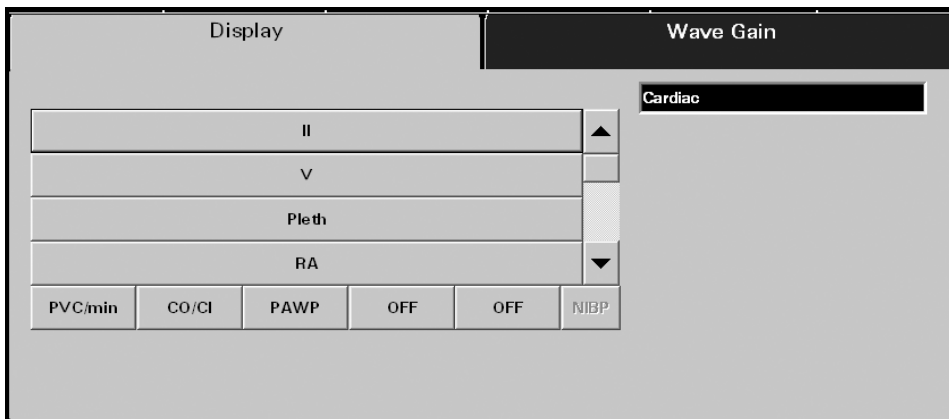
FIGURE 3-1 Example Display Tab

3.1.1   Accessing the Display Tab

• From the menu bar, select the **Patient Setup** button. The tabs associated with patient setup are displayed and the **Display** tab is enabled. The top four Waveform Parameter tiles and all of the Digital Parameter tiles remain visible.

3.1.2   Components of the Display Tab

The Waveform Parameter tiles are represented by long rectangular buttons (see FIGURE 3-2). The Digital Parameter tiles are represented by short rectangular buttons (see FIGURE 3-3). Each button is labeled with its assigned parameter and is presented in a layout that simulates the main screen. The active display configuration name is listed in the black text box. An asterisk appears to the left of the display configuration name when unsaved changes have been made.
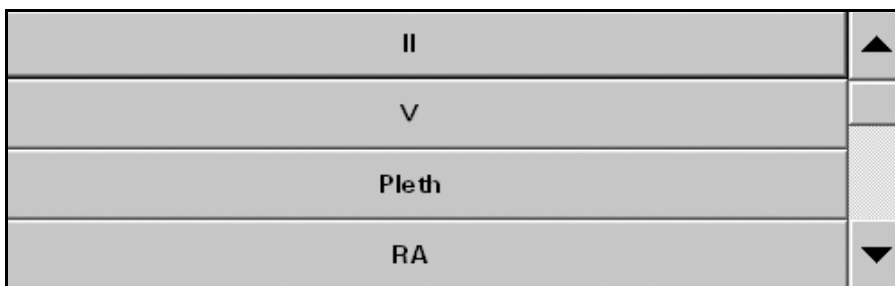
FIGURE 3-2 Example Waveform Parameter Tile Buttons

FIGURE 3-3 Example Digital Parameter Tile Buttons

Display Configuration Label Dialog

Up to 10 pre-configured displays are available on the Viewstation OR. The Display Configuration Label dialog lists all of the saved Viewstation OR display configuration labels. The following factory default settings and their associated parameters may be altered as needed during initial setup:

- Cardiac
  - ECG II waveform parameter tile
  - ECG V waveform parameter tile
  - SpO$_2$ waveform parameter tile
  - IBP1 waveform parameter tile
  - IBP2 waveform parameter tile
  - PVC/min digital parameter tile
  - CO/CI digital parameter tile
  - PAWP digital parameter tile

- ALL ECG
  - ECG II waveform parameter tile
  - ECG V waveform parameter tile
  - ECG I waveform parameter tile
  - ECG III waveform parameter tile
  - ECG aVR waveform parameter tile
  - ECG aVL waveform parameter tile
  - ECG aVF waveform parameter tile

- Resp
  - ECG II waveform parameter tile
  - SpO$_2$ waveform parameter tile
  - Resp waveform parameter tile
  - PVC/min digital parameter tile

- GI
  - ECG II waveform parameter tile
  - ECG V waveform parameter tile
  - SpO$_2$ waveform parameter tile
  - IBP I waveform parameter tile
  - PVC/min digital parameter tile

- Ortho
  - ECG II waveform parameter tile
  - SpO$_2$ waveform parameter tile
  - Resp waveform parameter tile
  - PVC/min digital parameter tile

- Neuro
  - ECG II waveform parameter tile
  - SpO$_2$ waveform parameter tile
  - Resp waveform parameter tile
  - PVC/min digital parameter tile

NOTE: **The available ECG parameter tiles are based on the ECG lead set and sensors that are being utilized.**

See "Loading a New Display Configuration," "Removing a Display Configuration," and "Editing a Display Name" for more information on the Display Configuration Label dialog.

3.1.3   Configuring the Waveform and Digital Parameter Areas

1. Select the waveform parameter tile button or digital parameter tile button that corresponds to the tile to which a new parameter will be assigned. The **Parameter** list box opens (see FIGURE 3-4). This list box is not presented in the **Display** tab until a parameter tile button is selected.
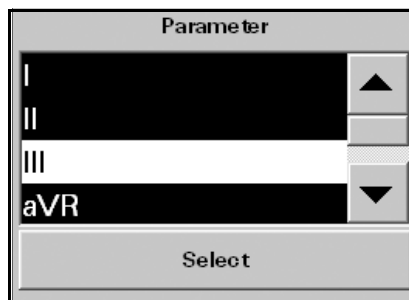
FIGURE 3-4 Example Parameter List Box

2. From the **Parameter** list box, select the new parameter to be assigned to the tile and choose the **Select** button.

NOTE: **An asterisk appears next to the configuration name, indicating that unsaved changes have been made to that configuration.**

3. Repeat steps 1 and 2 for all tiles to which a new parameter will be assigned.

4. When all new parameters have been assigned, select the **Save** sidebar button and proceed as described in section 3.1.4. To exit the **Display** tab without saving any changes, select the **Normal Screen** sidebar button. The dialog box shown in FIGURE 3-5 will open with the message, "Exiting the tab will not save the configuration. Are you sure you want to exit this tab without saving?" Select **Yes** to exit the **Display** tab without saving any changes. Select **No** to close the dialog box and return to the **Display** tab.
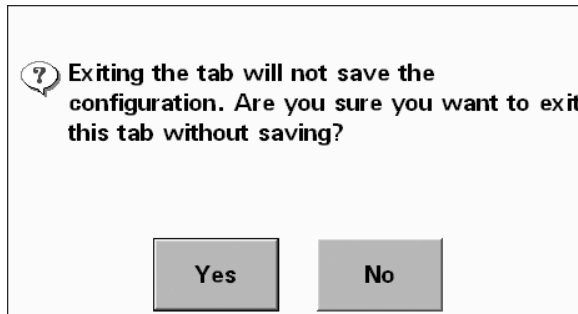
FIGURE 3-5 Exiting without saving

3.1.4   Saving a Display Configuration

To save a new display or overwrite an existing display with newly assigned parameters, proceed as follows:

1. Select the **Save** sidebar button.

- If fewer than 10 configurations have been saved, the **Overwrite/New** message dialog box (shown in FIGURE 3-6) will open. Proceed to step 2.
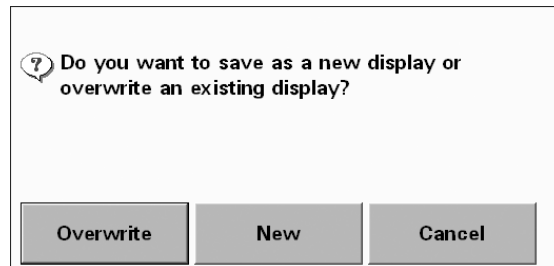
FIGURE 3-6 Overwrite/New Message Dialog Box

- If 10 configurations have already been saved, a dialog box will open with the message, "You have reached the maximum number of saved configurations. Do you want to overwrite an existing display?" (see FIGURE 3-7). Select **Yes** to open the **Display Config Label** dialog box (see FIGURE 3-8). Proceed to the first bullet under step 2 for further directions. Select **No** to close the dialog box and return to the **Display** tab without making changes.
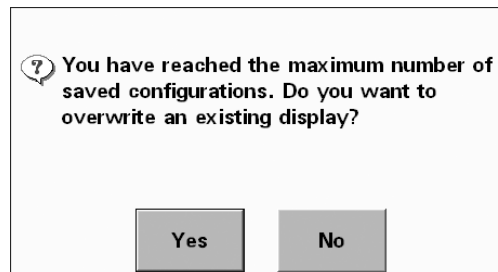
FIGURE 3-7 "Maximum Configurations Reached" Message Dialog Box

2. To overwrite an existing display, select the **Overwrite** button. To save as a new display, select the **New** button.

- Selecting the **Overwrite** button opens the **Display Config Label** dialog box (see FIGURE 3-8). Select the name of the configuration to be overwritten and choose the **Select** button. (Or choose the **Cancel** button to return to the **Display** tab without making changes.)

- Selecting the **New** button opens the **Configuration Label** keyboard (see FIGURE 3-9). Enter the new configuration name and select the **Enter** button. (Or select the **Close** button to return to the **Display** tab without saving the new configuration.)

- Select the **Cancel** button to return to the **Display** tab without making changes.

3.1.4.1   Loading a New Display Configuration

1. From the **Display** tab, select the **Load** sidebar button. The **Display Config Label** dialog box opens.
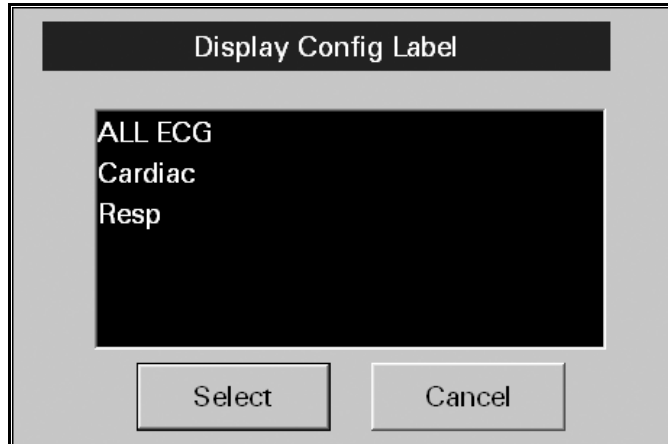
FIGURE 3-8   Example Display Config Label Dialog Box

2. Select the desired display and choose the **Select** button, or select the **Cancel** button to return to the **Display** tab without loading the display.

3.1.4.2   Removing a Display Configuration

1. From the **Display** tab, select the **Remove** sidebar button. The **Display Config Label** dialog box is opened.

2. Select the desired display and choose the **Select** button, or select the **Cancel** button to return to the **Display** tab without removing the display.

NOTE: **An active display cannot be removed.**

NOTE: **The Remove button is disabled if there is only one saved display.**

3.1.4.3   Editing a Display Name

1. From the **Display** tab, select the **Edit Labels** sidebar button. The **Display Config Label** dialog box is opened.

2. Select the desired display and choose the **Select** button. The **Configuration Label** keyboard (see FIGURE 3-9) is opened. (Select the **Cancel** button to return to the **Display** tab without editing the display.)

3. Edit the label name and select the **Enter** button or select the **Cancel** button to return to the **Display** tab without editing the display name.

Configuration Label Keyboard

The **Configuration Label** keyboard (shown in FIGURE 3-9) allows users to enter and edit alphanumeric information. This keyboard is similar to a standard computer keyboard.

NOTE: **Tab controls are disabled when the Configuration Label keyboard is displayed.**
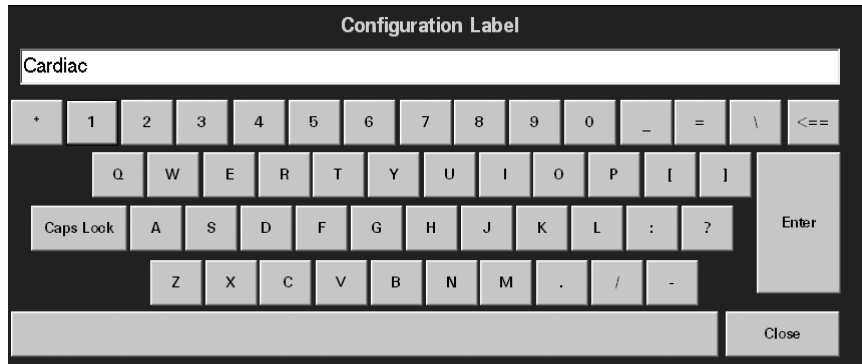
FIGURE 3-9 Configuration Label Keyboard

The Configuration Label Keyboard includes:

- The name of the selected field
- An Edit box to edit and enter the label
- A **Close** button to discard changes
- An **Enter** button to accept changes
- A Backspace (**<==**) button to clear a single character in the edit box
- A **Caps Lock** button to enable or disable caps lock (A Caps Lock indicator is shown when **Caps Lock** is enabled.)

3.1.5   Sidebar Buttons

The following sidebar buttons are used to expand the functionality of this tab.

Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

Save

The **Save** sidebar button saves changes made.

Load

The **Load** sidebar button was previously described in "Loading a New Display Configuration" on page 3-7.

Remove

The **Remove** sidebar button was previously described in "Removing a Display Configuration" on page 3-7.

Edit Labels

The **Edit Labels** sidebar button was previously described in "Editing a Display Name" on page 3-7.

3.1.6   Troubleshooting

This section lists some of the potential issues that may occur while using the **Display** tab.

ISSUE	REASON	SOLUTION
A waveform is not displayed.	The waveform has not been configured or the parameter is not being utilized.	Configure the waveform area and save the configuration.
A digital parameter is not displayed.	The digital parameter has not been configured or the parameter is not being utilized.	Configure the digital parameter area and save the configuration.
A display configuration cannot be removed.	The configuration is the current display.	Close the display and then remove the configuration.
The configuration is not displayed.	The configuration has not been saved.	Save the configuration.

3.2 Wave Gain Tab (Patient)

The **Wave Gain** tab (shown in FIGURE 3-10) is used to change the wave gain settings for the patient's available waveforms. The layout, functionality, and choice controls available in this tab will change based on the Spectrum OR™ configurations.

3.2.1 Accessing the Wave Gain Tab (Patient)

1. From the menu bar, select the **Patient Setup** menu button. The tabs associated with patient setup are displayed.
2. Select the **Wave Gain** tab.
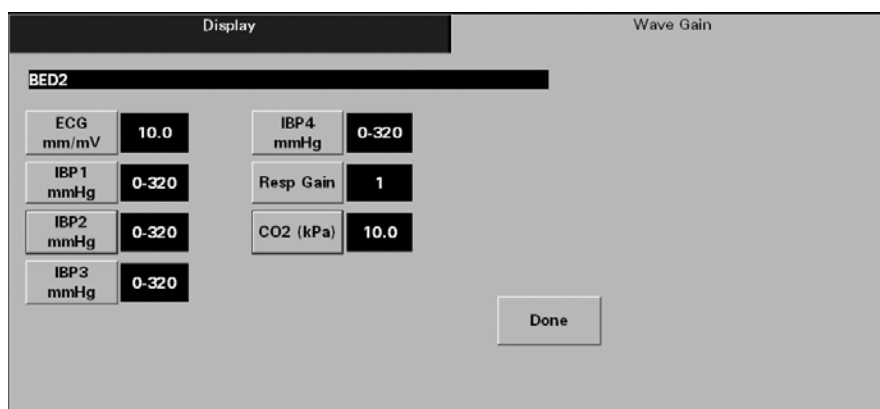
FIGURE 3-10 Example Wave Gain Tab

3.2.2 Configuring Wave Gain Settings

Viewstation OR waveform tiles will initially display the default settings as described in "Wave Gain Tab (System)" on page 4-5. Configurations made in **Patient Setup** mode only affect the active session.

1. In the **Wave Gain** tab, select the **ECG mm/mV** button until the desired wave gain displays. The settings available for the ECG wave gain include 2.5, 5.0, 10.0, 20.0, and 30.0 mm/mV.
2. Select the **IBP1 mmHg** through **IBP4 mmHg** buttons until the desired wave gain displays. The settings available for the IBP wave gain include 0 – 20, 0 – 40, 0 – 80, 60 – 140, 0 – 160, 0 – 225, 0 – 320, and (-10) – 10 mmHg.

NOTE: **If the IBP button(s) have been labeled at the Spectrum OR monitor, the same label(s) will be displayed on the individual wave gain button(s).**

3. Select the **Resp Gain** button until the desired wave gain is displayed. The settings available for the resp gain wave gain include 1, 2, 3, 4, and 5.
4. Select the **CO2 (%, kPa, mmHg)** button until the desired wave gain is displayed.
   - The CO_2 % wave gain settings include 5.0, 7.5, and 10.0 %.
   - The CO_2 kPa wave gain settings include 5.0, 7.5, and 10.0 kPa.
   - The CO_2 mmHg wave gain settings include 40, 60, and 100 mmHg.

5. Select the **Done** button to accept the wave gain settings shown in the **Wave Gain** tab or select the **Restore Previous Settings** sidebar button to reset the wave gains to their previous settings.

3.2.3   Sidebar Buttons

The following sidebar buttons are used to expand the functionality of the **Wave Gain** tab.

Restore Previous Settings

Select the **Restore Previous Settings** sidebar button to return patient display settings to those in use when the tab was opened.

Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

3.2.4   Troubleshooting

This section lists some of the potential issues that may occur while using the patient **Wave Gain** tab.

ISSUE	REASON	SOLUTION
The wave gain settings did not change	The **Done** button was not selected after the wave gain settings were changed.	Adjust the wave gain settings and select the **Done** button when the settings are completed.

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4.0   *System Setup Functions*

This section outlines the tabs associated with the Viewstation OR default configuration settings.

- Parameter Color Tab
- Equipment Setup Tab
- Wave Gain Tab (System)
- Touch Screen Tab

4.1 Parameter Color Tab

The **Parameter Color** tab (shown in FIGURE 4-1) selects the system default colors for the parameters which will be displayed in the parameter tiles. Individual parameter colors may also be adjusted via the **Sensor Color** configuration option in any waveform configuration dialog box (see the examples in FIGURE 2-2 and FIGURE 2-3).

4.1.1 Accessing the Parameter Color Tab

1. From the menu bar, select the **System Setup** button. The tabs associated with the **System Setup** button are displayed. By default, the **Parameter Color** tab is displayed first.
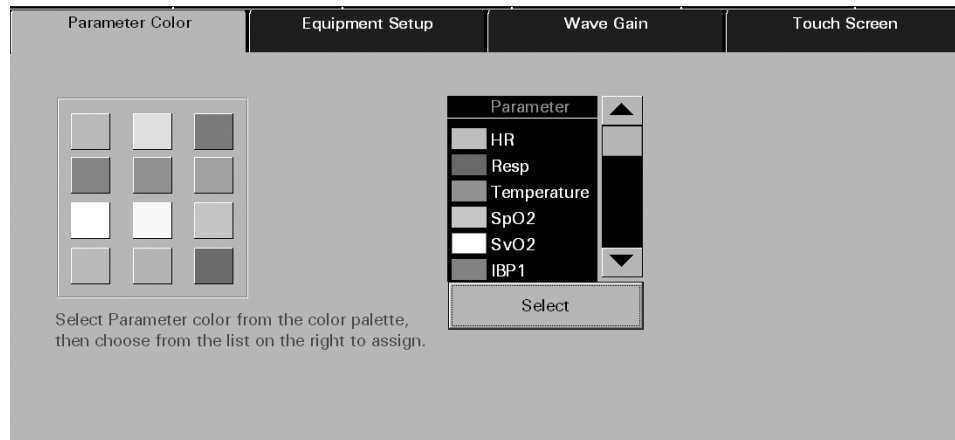
FIGURE 4-1 Example Parameter Color Tab

4.1.2 Selecting a Color for Parameter Data

This section outlines assigning a color to a parameter in the **Parameter Color** tab (see FIGURE 4-2).

1. Select a color tile button. A checkmark indicates that the colored tile is selected.
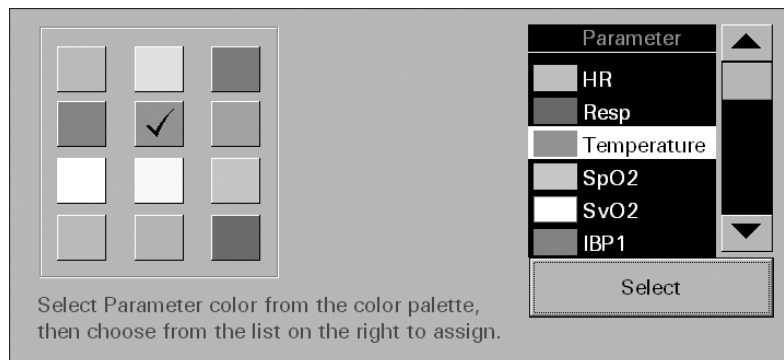
FIGURE 4-2 Example of a selected color tile

2. Select a parameter in the Parameter list box. When a parameter is selected, the associated label changes from a black background with white text to a white background with black text.

3. Choose the **Select** button to accept the parameter selection. The color is assigned to the selected parameter and the color icon is shown in the list box to the left of the parameter name.

4.1.3   Sidebar Button - Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

4.1.4   Troubleshooting

This section lists some of the potential issues that may occur while using the **Parameter Color** tab.

ISSUE	REASON	SOLUTION
A parameter color is different than expected.	The **Sensor Color** configuration option in a configuration dialog box was changed. When the color is changed in either a configuration dialog box or from the **Parameter Color** tab, the new color becomes the default.	Choose a new color as desired. This color becomes the default.

4.2   Equipment Setup Tab

The **Equipment Setup** tab connects and disconnects the Spectrum OR™ from the Viewstation OR computer. The Device ID text box lists the device ID of the Spectrum OR that is currently connected to the Viewstation OR.
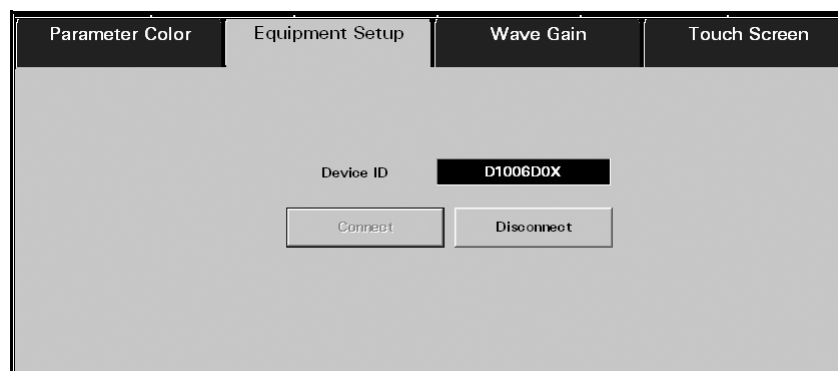
FIGURE 4-3 Example Equipment Setup Tab

4.2.1   Accessing the Equipment Setup Tab

1. From the menu bar, select the **System Setup** button.

2. Select the **Equipment Setup** tab.

4.2.2   Connecting Equipment

WARNING: **When connecting any Spectrum OR monitor, verify its location and associated device ID and bed number.**

1. From the **Equipment Setup** tab, disconnect any active equipment by selecting the **Disconnect** button.

2. Select the **Connect** button. The **Device ID** dialog box opens, listing all Spectrum OR™ bedside monitors available on the network.

3. Select the desired Spectrum OR to be connected.

4. Select the **Done** or **Cancel** button.

- The **Done** button accepts the change.
- The **Cancel** button rejects the change and closes the Device ID dialog box.

4.2.3   Sidebar Button - Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

4.2.4   Troubleshooting

This section lists some of the potential issues that may occur while using the **Equipment Setup** tab.

ISSUE	REASON	SOLUTION
The data that is being displayed at the Viewstation OR does not correspond to the data that is being displayed at the Spectrum OR monitor.	A different Spectrum OR monitor than the one that is desired is being displayed at the Viewstation OR.	Connect the desired Spectrum OR monitor to the Viewstation OR.
Data is not displayed.	A Spectrum OR monitor is not connected to the Viewstation OR.	Connect the desired Spectrum OR monitor to the Viewstation OR.
	There are no Spectrum OR monitors on the network.	Add Spectrum OR monitors to the network and connect the desired Spectrum OR monitor to the Viewstation OR.

4.3　　　Wave Gain Tab (System)

The **Wave Gain** tab (shown in FIGURE 4-4) is used to select the default wave gain settings. For information regarding individual wave gain settings, refer to the "Wave Gain Tab (Patient)" on page 3-10.

NOTE:　　**The changes made in the Wave Gain tab (System) will apply to newly admitted Spectrum OR monitors.**

4.3.1　　　Accessing the Wave Gain Tab

1. From the menu bar, select the **System Setup** button.

2. Select the **Wave Gain** tab.

Parameter Color	Equipment Setup	Wave Gain	Touch Screen

ECG mm/mV	10.0	IBP4 mmHg	0-320	
IBP1 mmHg	0-320	Resp Gain	1	
IBP2 mmHg	0-320	CO2 %	10.0	
IBP3 mmHg	0-320			
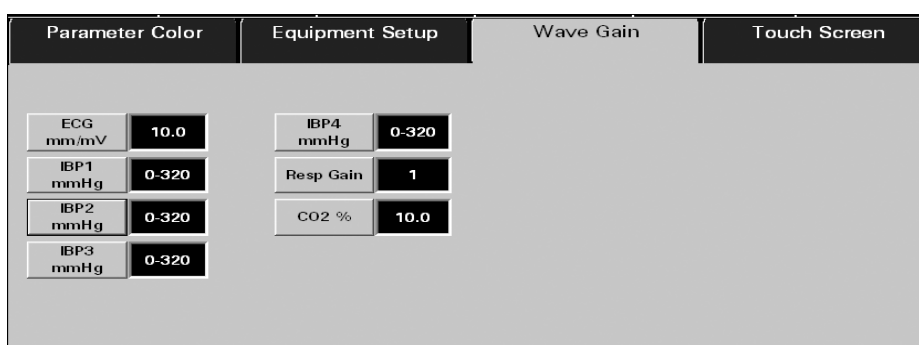
FIGURE 4-4 Example Wave Gain Tab (System)

4.3.2　　　Changing the System Default Wave Gain Settings

This section outlines entering and modifying the system default wave gain settings.

1. Select the **ECG mm/mV** button until the desired ECG wave gain is displayed.

- The settings available for the ECG wave gain include 2.5, 5.0, 10.0, 20.0, and 30.0 mm/mV. The factory default setting is 10.0 mm/mV.

2. Select the **IBP1 mmHg** through **IBP4 mmHg** buttons until the desired IBP wave gains are displayed. There are four IBP buttons.

- The settings available for the IBP wave gains include 0 – 20 mmHg, 0 – 40 mmHg, 0 – 80 mmHg, 60 – 140 mmHg, 0 – 160 mmHg, 0 – 225 mmHg, 0 – 320 mmHg and (-10) – 10 mmHg. The factory default setting is 0 – 320 mmHg.

3. Select the **Resp Gain** button until the desired Resp Gain wave gain is displayed.

- The settings available for the Resp Gain wave gain include 1, 2, 3, 4, and 5. The factory default setting is 1.

4. Select the **CO2 (%, kPa, mmHg)** button until the desired wave gain is displayed.

- CO_2 % wave gain settings include 5.0, 7.5, and 10.0 %.

- CO_2 kPa wave gain settings include 5.0, 7.5, and 10.0 kPa.

- CO_2 mmHg wave gain settings include 40, 60, and 100 mmHg.

4.3.3　　　Sidebar Button - Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

4.4   Touch Screen Tab

A Viewstation OR configuration can include a touch screen display. A touch pad or mouse can also be used for point-and-click system navigation. This section provides an overview of how to turn the touch screen on and off and how to recalibrate it.
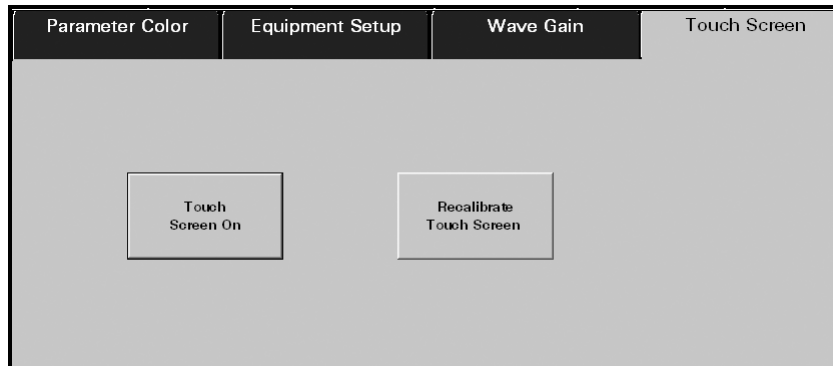
FIGURE 4-5 Touch Screen Tab

4.4.1   Accessing the Touch Screen Tab

1. From the menu bar, select the **System Setup** button.

2. Select the **Touch Screen** tab.

4.4.1.1   Turning the Touch Screen On and Off

The touch screen functionality must be turned off before cleaning (see "Care and Cleaning of the Touch Screen" on page 5-2). There is one button for turning the touch screen on or off. The touch screen must be enabled to exit the Touch Screen tab.

• When the **Touch Screen On** button displays, the touch screen is active.

• When the **Touch Screen Off** button displays, the touch screen is inactive.

FIGURE 4-6 Touch Screen On Button
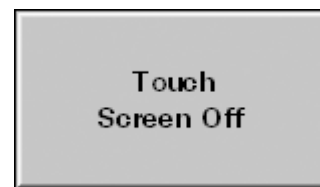
FIGURE 4-7 Touch Screen Off Button

NOTE: **When the Touch Screen Off button displays, the message "Touch Screen OFF" will display in the System Status/ Demographics area.**

4.4.1.2 Recalibrating the Touch Screen

The touch screen should be recalibrated whenever the touch interface becomes difficult to maneuver.

1. From the **Touch Screen** tab, select **Recalibrate Touch Screen**. The recalibration process is initiated (see FIGURE 4-8).

NOTE: **The text in the Recalibrate Touch Screen display is always displayed in the English language.**

NOTE: **During the recalibration process, the parameter tiles, menu bar, and sidebar buttons will be replaced by the recalibration screen.**
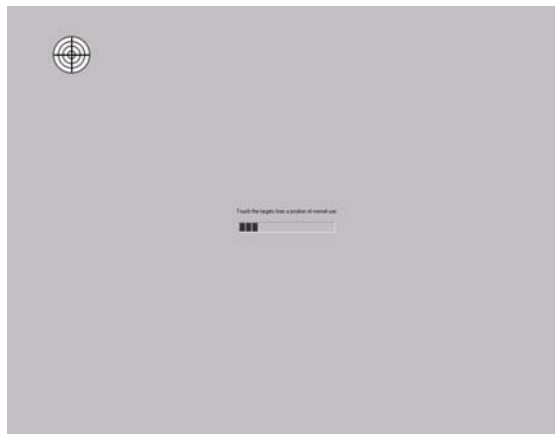
FIGURE 4-8 Touch Screen Recalibration

2. Touch the red targets on the screen as instructed. Three calibration targets are displayed.

3. The message **Touch the screen. Does the cursor follow your finger?** is displayed (see FIGURE 4-9). Touch all four corners and all four sides of the screen.

FIGURE 4-9 Check Calibration Screen

The ✓ and ↺ buttons appear.

- Select the ✓ button if the targets moved as they were selected. Once selected, the screen is recalibrated.
- Select the ↺ button if the targets did not move as they were selected. Once selected, the recalibration process begins again.

The message box will time out in thirty seconds and the recalibration of the touch screen will automatically be accepted.

4.4.2 Sidebar Button - Normal Screen

Select the **Normal Screen** sidebar button to return the display to the full screen mode, and close all tabs, message boxes, and dialog boxes.

NOTE: **The Normal Screen sidebar button does not display while the touch screen is recalibrating.**

4.4.3 Troubleshooting

This section lists some of the potential issues that may occur while recalibrating the **Touch Screen** tab.

ISSUE	REASON	SOLUTION
Recalibration settings not accepted	The Recalibration screen timed out because the first target was not touched within 30 seconds.	Try to recalibrate again and touch the first target before the 30 second time out.
Recalibration steps are repeated	The ↺ button was selected in error.	Recalibrate again and if the targets moved as they were selected, select the ✓ button.

Contact your local Mindray DS Service Representative if recalibration of the touch screen does not improve the performance of the touch screen display.

5.0   *User Maintenance*

This section of the manual outlines proper maintenance of the Viewstation OR touch screen.

5.1   Care and Cleaning of the Touch Screen

For the best performance, it is recommended that the Viewstation OR touch screen be kept clean.

NOTE: **The touch screen must be turned off prior to cleaning. (See "Turning the Touch Screen On and Off" on page 4-6.)**

Observe the following precautions when cleaning the touch screen:

CAUTION: **To avoid potential system issues, deactivate the touch screen before cleaning.**

CAUTION: **DO NOT spray glass cleaner directly on a display as it could possibly leak inside a non-sealed unit and cause damage.**

- Always remember to use a cloth or towel to apply glass cleaner to the touch screen.
- Any standard glass cleaner can be used to clean the touch screen. DO NOT use abrasive cleaning materials to clean a touch screen. DO NOT use alcohol or solvents containing chlorinated hydrocarbons.
- Remove fingerprints and stains by using a liquid lens cleaner and a soft cloth.
- Use a fine soft-hair brush to carefully brush away dust and dirt particles.

NOTE: **Remember to turn the touch screen back on after cleaning. (See "Turning the Touch Screen On and Off" on page 4-6.)**

6.0　　*Parameter Specifications*

This section is for reference only to list the allowable range specifications for all of the parameters measured by the Spectrum OR™.

6.1   Heart Rate (HR)

The Heart Rate parameter obtains data from ECG and IBP sources.

Unit of Measure: Beats Per Minute (bpm)

Resolution: 1 bpm

Heart Rate Source: ECG

PATIENT SIZE	MINIMUM VALUE (bpm)	MAXIMUM VALUE (bpm)
Neonate	30	350
Pediatric	30	300
Adult	30	300

The Viewstation OR displays ECG waveforms when using 3-wire and 5-wire lead cables. The ECG leads available at the Viewstation OR are dependent on the lead cable connected to the patient.

LEAD	WAVEFORM LEADS AVAILABLE
3-wire lead set	I, II, III
5-wire lead set	I, II, III, aVR, aVL, aVF, V

Heart Rate Source: IBP

PATIENT SIZE	MINIMUM VALUE (bpm)	MAXIMUM VALUE (bpm)
Neonate	30	350
Pediatric	30	300
Adult	30	300

6.2   Respiration (Resp)

The Respiration parameter obtains data from ECG and CO_2 sources.

Unit of Measure: Respirations Per Minute (rpm)

Resolution: 1 rpm

Respiration Source: ECG Thoracic Impedance

PATIENT SIZE	MINIMUM VALUE (rpm)	MAXIMUM VALUE (rpm)
Neonate	4	199
Pediatric	4	199
Adult	4	199

Respiration Source: CO_2

PATIENT SIZE	MINIMUM VALUE (rpm)	MAXIMUM VALUE (rpm)
Neonate	0	150
Pediatric	0	150
Adult	0	150

The Viewstation OR supports respiration waveforms.

6.3 NIBP

The NIBP parameter includes measurements for the Systolic (Sys), Diastolic (Dia), Mean and Elapsed Time (ET).

Unit of Measure: mmHg

Resolution: 1 mmHg

ET

Unit of Measure: minute

Resolution: 1 minute

NIBP (Sys)

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	45	120
Pediatric	55	160
Adult	55	235

NIBP (Dia)

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	20	100
Pediatric	30	150
Adult	30	200

NIBP (Mean)

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	greater than the NIBP (Dia) value	less than the NIBP (Sys) value
Pediatric	greater than the NIBP (Dia) value	less than the NIBP (Sys) value
Adult	greater than the NIBP (Dia) value	less than the NIBP (Sys) value

NIBP (ET)

PATIENT SIZE	MINIMUM VALUE (MINUTES)	MAXIMUM VALUE (MINUTES)
Neonate	0	999
Pediatric	0	999
Adult	0	999

6.4   SpO₂

The SpO₂ parameter includes measurements from Masimo SET® and Nellcor® SpO₂ sensors.

Unit of Measure:	%
Resolution:	1%

PATIENT SIZE	MINIMUM VALUE (%)	MAXIMUM VALUE (%)
Neonate	–	100
Pediatric	–	100
Adult	–	100

The Viewstation OR supports SpO₂ waveforms.

6.5   IBP

The Viewstation OR supports up to four invasive blood pressure parameters. The measurements shown for each pressure include Systolic (Sys), Diastolic (Dia) and Mean.

NOTE: **IBP parameter labels include IBP, Art, UA, LV, PA, CVP, ICP, LA, and RA. The label used is based on the label selected at the Spectrum OR monitor.**

Resolution:	1 mmHg

IBP (Sys)

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	-30	300
Pediatric	-30	300
Adult	-30	300

IBP (Dia)

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	-30	300
Pediatric	-30	300
Adult	-30	300

IBP Mean

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Neonate	-30	300
Pediatric	-30	300
Adult	-30	300

The Viewstation OR supports IBP waveforms. The Viewstation OR will not display an IBP waveform if the IBP cable is not connected to the system.

6.6 CO_2

The Viewstation OR supports the mmHg, kPa and % units of measure for CO_2.

NOTE: **The unit of measure shown for CO_2 is based on the selection made at the Spectrum OR monitor.**

Units of Measure: mmHg, %, kPa

Resolution: 1 mmHg, 1 %, 1 kPa

6.7   Temperature (T1, T2, and T Blood)

The Viewstation OR supports four temperature measurements.

Units of Measure: F° and C°

Resolution: 0.1 F° and 0.1 C°

T1 and T2

PATIENT SIZE	MINIMUM VALUE (F°)	MAXIMUM VALUE (F°)
Neonate	59	113
Pediatric	59	113
Adult	59	113

PATIENT SIZE	MINIMUM VALUE (C°)	MAXIMUM VALUE (C°)
Neonate	15	45
Pediatric	15	45
Adult	15	45

T Blood Values

PATIENT SIZE	MINIMUM VALUE (F°)	MAXIMUM VALUE (F°)
Neonate	Not Applicable	Not Applicable
Pediatric	63.7	109.1
Adult	63.7	109.1

6.8   Cardiac Output

Unit of Measure: lpm

Resolution: 0.1 lpm

PATIENT SIZE	MINIMUM VALUE (LPM)	MAXIMUM VALUE (LPM)
Pediatric	0.2	20.0
Adult	0.2	20.0

6.9   Cardiac Index

Unit of Measure: lpm/m^2

Resolution: $0.1\ lpm/m^2$

PATIENT SIZE	MINIMUM VALUE (LPM/M^2)	MAXIMUM VALUE (LPM/M^2)
Pediatric	0.1	20.0
Adult	0.1	20.0

6.10   Pulmonary Artery Wedge Pressure (PAWP)

Unit of Measure: mmHg

Resolution: 1 mmHg

PATIENT SIZE	MINIMUM VALUE (mmHg)	MAXIMUM VALUE (mmHg)
Pediatric	-30	300
Adult	-30	300

6.11 Invalid Data Display

The Viewstation OR uses dashes (–), Xs (XX) or a straight line (waveform) to show invalid data.

Dashes (--) Digital Data

Digital data is replaced with dashes (–) for the following reasons:

- Data is above the maximum value
- Data is below the minimum value
- Parameter is not available
- Lead or a sensor is off
- Sensor is not zeroed
- Parameter is zeroing
- Measurement has not been taken
- Measurement is being taken
- Measurement has timed out
- Measurement is being retried
- Parameter is turned off

Xs (XX) Digital Data

Digital data is replaced with Xs (XX) for the following reasons:

- IBP parameter is not zeroed
- NIBP parameter failed to obtain a reading
- CO_2 not calibrated

Straight Line (Waveforms)

Waveform data is replaced with a continuous straight line for the following reasons:

- ECG leads are disconnected
- ECG cable is not connected to the system
- Respiration parameter is disabled at the Spectrum OR monitor and the source is ECG
- SPO_2 cable is connected and not in use
- IBP cable is connected but not zeroed or is zeroing
- CO_2 filter line is not in use or is zeroing

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7.0 _____ *Performance Specifications*

This section outlines performance specifications for the Viewstation OR.

- ECG
- ECG Derived Heart Rate Meter
- Viewstation OR Computer
- I/O Control Devices
- Displays

7.1 ECG

Three Lead Displayable Leads:	I, II, III (one vector at a time)
Five Lead Displayable Leads:	I, II, III, aVR, aVL, aVF, V
Aspect Ratio	0.4 ± 0.08 sec/mV (met by 25 mm/s) ANSI/AAMI EC13-2002, 4.2.9.7 (b)
Channel Width	40 mm. min ANSI/AAMI EC13-2002, 4.2.9.7 (a)
Pacer Rejection	The heart rate meter rejects pulses of amplitude signals from ±2mV to ±700mV and duration 0.1ms to 2ms with no tail according to ANSI/AAMI EC13-2002 Section 4.1.4.1 (No tails).
Pacemaker Pulse Rejection Capability	The pacer detector's slew rate is 6.024V/s

7.1.1 ECG Derived Heart Rate Meter

Range:	30 to 300 bpm Adult/Pediatric ANSI/AAMI EC13–2002, 4.2.7 30 to 350 bpm Neonatal ANSI/AAMI EC13–2002, 4.2.7
Resolution:	1 bpm

7.1.2 ECG Respiration

Range:	4 to 199 breaths per minute
Resp. Scale:	1, 2, 3, 4 or 5 with standard ECG cable

7.2   NIBP

7.2.1   Systolic Pressure Measurement

Range:	55 to 235 mmHg in Adult mode
	55 to 160 mmHg in Pediatric mode
	45 to 120 mmHg in Neonatal mode
Resolution:	1 mmHg

7.2.2   Diastolic Pressure Measurement

Range:	30 to 200 mmHg in Adult mode
	30 to 150 mmHg in Pediatric mode
	20 to 100 mmHg in Neonatal mode
Resolution:	1 mmHg

7.2.3   Pulse Rate

Range:	35 to 245 bpm, for Adults/Pediatric
	70 to 245 bpm, for Neonate
Resolution:	1 bpm

7.3   IBP

Range:	-30 to 300 mmHg after zeroing at the Spectrum OR™

7.3.1   IBP Heart Rate Meter

Range:	30 to 300 bpm Adult/Pediatric
	30 to 350 bpm Neonatal
Resolution:	1 bpm

7.4   Temperature

Scale:	Selectable Celsius or Fahrenheit
Range:	15 °C to 45 °C 59 °F to 113 °F
Resolution:	0.1 °C 0.1 °F

7.5   SpO$_2$

SpO$_2$ Range:	70% to 100%
SpO$_2$ Pulse Rate Range:	20 to 249 bpm

7.6   CO$_2$

Range:	0 - 13%s
Respiration Rate Range:	0 - 150 breaths/minute

7.7 Viewstation OR Computer

There is one basic hardware platform for the Viewstation OR computer system. It contains the following:

- 1 GB of RAM
- 80 GB system hard drive, minimum
- Four channel serial interface for touch screen inputs and future features
- 2 on-board Ethernet connectors
- CD-R/W
- 3.5" Floppy Drive

7.7.1 Real Time Clock

This is used for various time-related functions in Viewstation OR.

7.7.2 Power Supply

Voltage

- 100-240 VAC (±10%)

Frequency

- 60/50 Hz (±3Hz)

Viewstation OR Power Consumption Maximum

- 115 VAC @ 1.4 A + 20%
- 230 VAC @ 0.6 A + 20%

7.7.3 Operating Temperature

- +5 to +40 ° C

7.7.4 Operating Humidity

- 20% to 80% Relative Humidity Maximum, non-condensing, maximum wet bulb 29 ° C

7.7.5 Operating Altitude

- 1060 to 700 hPa (-1250 to 9889 feet ASL) (-380 - 3014 m) (795 to 525 mmHg)

7.7.6   Storage Temperature

- -20 to +60 ° C

7.7.7   Storage Humidity

- 5% to 80% Relative Humidity Maximum, non-condensing, maximum wet bulb 35 ° C

7.7.8   Storage Altitude

- 1060 to 700 hPa (-1250 to 9889 feet ASL) (-380 - 3014 m) (795 to 525 mm Hg)

7.7.9   Safety Standards

The Viewstation OR complies with relevant portions of the following standards:

1.	UL 60950-1:2003	Safety of Information Technology Equipment
2.	CSA-C22.2 60950-1-03	Safety of Information Technology Equipment
3.	IEC 60601-1-2:2001	Electromagnetic compatibility
4.	ANSI/AAMI EC 13:2002, 4.2.9.7 (a) (b), 4.1.4.1	Cardiac Monitors, heart rate meters, and alarms
5.	ISTA Test Procedure 1A	Shipping Integrity Test

SAFETY DESIGNATIONS
SEE SECTION 7.7.10 (TABLE 7-1, TABLE 7-2, TABLE 7-3, TABLE 7-4)

Mode of Operation	Continuous
Protection Against Hazards of Explosion	Non Protected (ordinary)
Protection Against Ingress of Liquids	IPX0 (ordinary, non-protected)
Degree of Mobility	Stationary, Intra Hospital

7.7.10   Electromagnetic Compatibility

The Viewstation OR meets the requirements of IEC 60601-1-2:2001.

NOTE: **The Viewstation OR needs special precautions regarding Electro Magnetic Compatibility (EMC) and needs to be installed and put into service according to the EMC information provided in this section.**

NOTE: **Portable and mobile RF communications equipment can affect the Viewstation OR. Refer to Table 7-1 on page 7-7, Table 7-2 on page 7-8, and Table 7-4 on page 7-10.**

TABLE 7-1

GUIDANCE AND MINDRAY DS USA INC. DECLARATION - ELECTROMAGNETIC EMISSIONS

The Viewstation OR is intended for use in the electromagnetic environment specified below. The customer or the user of the Viewstation OR should assure that it is used in such an environment.

EMISSIONS TEST	COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE
RF emissions CISPR 11	Group 1	The Viewstation OR uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The Viewstation OR is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes
Harmonic emissions IEC 61000-3-2 *	Class A	
Voltage fluctuations/ Flicker emissions IEC 61000-3-3 *	Complies	

*   Viewstation OR and Panorama Server only

TABLE 7-2

GUIDANCE AND MINDRAY DS USA INC. DECLARATION - ELECTROMAGNETIC IMMUNITY

The Viewstation OR is intended for use in the electromagnetic environment specified below. The customer or the user of the Viewstation OR should assure that it is used in such an environment.

IMMUNITY TEST	IEC 60601 TEST LEVEL	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be typical of a commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be typical of a commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0,5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (>95% dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0,5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles < 5% U_T (>95% dip in U_T) for 5 sec	Mains power quality should be typical of a commercial or hospital environment. If the user requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

U_T is the a.c. mains voltage prior to application of the test level.

TABLE 7-3

GUIDANCE AND MINDRAY DS USA INC. DECLARATION - ELECTROMAGNETIC IMMUNITY

The Viewstation OR is intended for use in the electromagnetic environment specified below. The customer or the user of the Viewstation OR should assure that it is used in such an environment.

IMMUNITY TEST	IEC 60601 TEST LEVEL	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT - GUIDANCE
			Portable and mobile RF communications equipment should be used no closer to any part of the Telepack, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.2 \times \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.2 \times \sqrt{P}$ 80 MHz to 800 MHz $d = 2.3 \times \sqrt{P}$ 80 MHz to 2.5 GHz Where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[*] should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol:

NOTE: **At 80 MHz and 800 MHz, the higher frequency range applies.**

NOTE: **These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.**

* *Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment, due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength where the Telepack is used exceeds the applicable RF compliance level, the Telepack should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Telepack.*

NOTE: **Viewstation OR equipment should not be used in the presence of high energy amplitude modulated (AM) signals that are operating within the audible range. These signals are not normally found in the hospital environment.**

TABLE 7-4

RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT AND THE VIEWSTATION OR AND TELEMETRY SERVER

The Viewstation OR is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of thee Viewstation OR can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Viewstation OR as recommended below, according to the maximum output power of the communications equipment.

RATED MAXIMUM OUTPUT POWER OF TRANSMITTER W (WATTS)	SEPARATION DISTANCE ACCORDING TO FREQUENCY OF TRANSMITTER M (METERS)		
	150 KHZ TO 80 MHZ $D = 1.2 \times \sqrt{P}$	**80 MHZ TO 800 MHZ** $D = 1.2 \times \sqrt{P}$	**800 MHZ TO 2.5 GHZ** $D = 2.3 \times \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be determined using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE: **At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.**

NOTE: **These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.**

7.7.11 Physical Characteristics

Maximum Size

- Depth: 17.5" (445.5 mm)
- Height: 17.0" (431.8 mm)
- Width: 7.5" (190.5 mm)

Maximum Weight

- 30.0 lbs (13.6 kg)

7.8   I/O Control Devices

The Viewstation OR can be used with a mouse, touch pad and touch screen. These I/O control devices are used to make selections from various menus and screens. The mouse and touch pad are supported for system diagnostics and user interface, operating independent of the touch screen.

NOTE: **The mouse and touch pad connect to the PS/2 port on the CPU. Since there is only one PS/2 port, these I/O control devices cannot be used simultaneously.**

NOTE: **Touch screen capability is dependent on the chosen display as detailed in the next section.**

7.9   Displays

7.9.1   Mindray DS Supplied ELO-Compatible Touch Screen Display

- A Surface Acoustical Wave (SAW) touch screen is supported as the standard input device on the 19" display.
- The touch screen operates independent of a mouse or touch pad interface.
- The actual touch screen and its controller are integrated into the display.
- The touch screen communication is accepted by Viewstation OR via a serial port.
- Use of the touch screen does not preclude the use of a mouse or touch pad.

7.9.2   Customer Supplied Compatible Displays

- Contact Mindray DS Customer Support for requirements.

7.10   Warranty

Domestic Warranty

Mindray DS USA Inc. warrants that its products will be free from defects in workmanship and materials for a period of one (1) year from the date of purchase. Disposable or one-time use products are warranted to be free from defects in workmanship and materials up to a date one year from the date of purchase or the date of first use, whichever is sooner. This warranty does not cover consumable items such as, but not limited to, batteries, external cables, sensors, cuffs, hoses, or mounts.

Mindray DS USA Inc. shall not be liable for any incidental, special, or consequential loss, damage, or expense directly or indirectly arising from the use of its products, liability under this warranty and the buyer's exclusive remedy under this warranty is limited to servicing or replacing at Mindray DS's option at the factory or at an authorized Mindray DS Distributor, any product which shall under normal use and service appear to the Company to have been defective in material or workmanship.

No agent, employee, or representative of Mindray DS USA Inc. has any authority to bind Mindray DS USA Inc. to any affirmation, representation, or warranty concerning its products, and any affirmation, representation or warranty made by any agent, employee, or representative shall not be enforceable by buyer.

This warranty is expressly in lieu of any other express or implied warranties, including any implied warranty or merchantability or fitness, and of any other obligation on the part of the seller.

Damage to any product or parts through misuse, neglect, accident, or by affixing any non-standard accessory attachments or by any customer modification voids this warranty. Mindray DS USA Inc. makes no warranty whatever in regard to trade accessories, such being subject to the warranty of their respective manufacturers.

A condition of this warranty is that this equipment or any accessories which are claimed to be defective be returned when authorized by Mindray DS, freight prepaid to Mindray DS USA Inc., Mahwah, New Jersey 07430. Mindray DS USA Inc. shall not have any responsibility in the event of loss or damage in transit.

Calibration may be performed without the need to disassemble the instrument. It is the responsibility of the purchaser to perform calibration as necessary, in accordance with the instructions provided in this manual.

International Warranty

Mindray DS USA Inc. warrants that its products will be free from defects in workmanship and materials for a period of two (2) years from the date of purchase. Disposable or one-time use products are warranted to be free from defects in workmanship and materials up to a date one year from the date of purchase or the date of first use, whichever is sooner. This warranty does not cover consumable items such as, but not limited to, batteries, external cables, sensors, cuffs, hoses, or mounts.

Mindray DS USA Inc. shall not be liable for any incidental, special, or consequential loss, damage, or expense directly or indirectly arising from the use of its products, liability under this warranty and the buyer's exclusive remedy under this warranty is limited to servicing or replacing at Mindray DS's option at the factory or at an authorized Mindray DS Distributor, any product which shall under normal use and service appear to the Company to have been defective in material or workmanship.

No agent, employee, or representative of Mindray DS USA Inc. has any authority to bind Mindray DS USA Inc. to any affirmation, representation, or warranty concerning its products, and any affirmation, representation or warranty made by any agent, employee, or representative shall not be enforceable by buyer.

This warranty is expressly in lieu of any other express or implied warranties, including any implied warranty or merchantability or fitness, and of any other obligation on the part of the seller.

Damage to any product or parts through misuse, neglect, accident, or by affixing any non-standard accessory attachments or by any customer modification voids this warranty. Mindray DS USA Inc. makes no warranty whatever in regard to trade accessories, such being subject to the warranty of their respective manufacturers.

A condition of this warranty is that this equipment or any accessories which are claimed to be defective be returned when authorized by Mindray DS, freight prepaid to Mindray DS USA Inc., Mahwah, New Jersey 07430. Mindray DS USA Inc. shall not have any responsibility in the event of loss or damage in transit.

Calibration may be performed without the need to disassemble the instrument. It is the responsibility of the purchaser to perform calibration as necessary, in accordance with the instructions provided in this manual.

7.11   Phone Numbers and How To Get Assistance

Mindray DS maintains a network of service representatives and factory-trained distributors. Prior to requesting service, perform a complete operational check of the instrument to verify proper control settings. If operational problems continue to exist, contact the Mindray DS Service Department at (800) 288-2121 or (201) 995-8116 for assistance in determining the nearest field service location.

Please include the instrument model number, the serial number, and a description of the problem with all requests for service.

Any questions regarding the warranty should be directed to the nearest Mindray DS location. A list of international offices, along with their phone numbers, is provided at the end of this manual.

7.12   Mindray DS's Responsibility

Mindray DS is responsible for the effects on safety, reliability and performance of the equipment only if:

a. assembly operations, extensions, readjustments, modifications or repairs are carried out by persons authorized by Mindray DS; and

b. the electrical installation of the relevant room complies with the appropriate requirements; and

c. the equipment is used in accordance with the instructions for use

8.0 *Glossary*

This section provides a glossary of terminology used throughout the Viewstation OR Operating Instructions.

• Terms, Acronyms, and Abbreviations

8.1   Terms, Acronyms, and Abbreviations

TERMS	DEFINITIONS
Bedside Monitor	A monitoring device that has its own user interface and does not require the Viewstation OR to be its primary monitoring source
CCI	Continuous Cardiac Index
CCO	Continuous Cardiac Output
CI	Cardiac Index
CO	Cardiac Output
Heart Rate	Number of heartbeats detected during a one minute time period
Invasive Blood Pressure (IBP)	Method of obtaining blood pressure using an internal pressure sensor
Monitoring Device	The instrumentation connected to the patient. The monitoring device acquires the patient data and then transmits it onto the network.
Non-Invasive Blood Pressure (NIBP)	Method of obtaining blood pressure using an external cuff
Panorama Patient Network	Supports hardwired communication of the real-time patient data collected by monitoring devices attached to the patient
PAWP	Pulmonary Artery Wedge Pressure
Respiration Rate	Number of breaths during a one minute time period
SpO$_2$	Level of Oxygen Saturation in the blood
SvO$_2$	Mixed Venous Oxygen Saturation

ACRONYMS/ ABBREVIATIONS	DEFINITIONS
ART	Arterial Line
BPM	Beats per minute
CO$_2$	Carbon Dioxide
CVP	Central Venous Pressure
ECG	Electrocardiogram
EMC	Electromagnetic Compatibility
ET	End-Tidal when referencing CO$_2$ parameters
	Elapsed Time when referencing NIBP
HR	Heart Rate
IBP	Invasive Blood Pressure
ICP	Intracranial Pressure
IEC	International Electro-Technical Commission
INSP	Inspired
kPa	Kilopascals Per Atmosphere
LA	Left Arm when referring to ECG Leads (AHA)
LV	Left Ventricle
MDD	Medical Device Directive
mmHg	Millimeters of Mercury
NIBP	Non-Invasive Blood Pressure
PA	Pulmonary Artery
Pleth	Plethysmograph
PVC	Premature Ventricular Contraction
RA	Right Atrium when referring to IBP
	Right Arm when referring to ECG Leads (AHA)
RESP	Respiration Rate
RL	Right Leg when referring to ECG Leads (AHA)
RPM	Respirations per minute
SAW	Surface Acoustical Wave
Tb	Temperature of the Blood
UA	Umbilical Artery
V	Chest Lead (AHA)